Critical Thinking Skills

Global Warming: Causes

Skills For Critical Thinking		Reading								Hands-on Activities
		Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	
LEVEL 1 Knowledge	• List Details/Facts	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Recall Information	✓	✓	✓	✓	✓	✓	✓	✓	
	• Match Vocabulary to Definitions	✓	✓	✓	✓	✓	✓	✓	✓	
	• Define Vocabulary	✓	✓	✓	✓	✓	✓	✓	✓	
	• Recognize Validity (T/F)			✓		✓	✓			
LEVEL 2 Comprehension	• Demonstrate Understanding	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Explain Scientific Causation	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Rephrasing Vocab Meaning	✓	✓	✓	✓	✓	✓	✓	✓	
	• Describe	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Classify Objects into Groups		✓	✓	✓		✓		✓	✓
LEVEL 3 Application	• Application to Own Life	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Model Scientific Process	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Organize and Classify Facts	✓	✓	✓	✓	✓	✓	✓	✓	
	• Utilize Alternative Research Tools	✓	✓	✓	✓	✓	✓	✓	✓	✓
LEVEL 4 Analysis	• Distinguish Meanings	✓	✓	✓	✓	✓	✓	✓	✓	
	• Make Inferences	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Draw Conclusions Based on Facts provided	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Classify Based on Facts Researched	✓		✓		✓	✓		✓	✓
	• Sequence Events		✓	✓	✓	✓	✓	✓		✓
LEVEL 5 Synthesis	• Compile Research Information	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Design and Application		✓	✓	✓	✓	✓	✓	✓	✓
	• Create and Construct	✓	✓	✓	✓	✓	✓	✓	✓	✓
	• Imagine Self in Scientific Role	✓		✓	✓	✓	✓		✓	✓
LEVEL 6 Evaluation	• State and Defend an Opinion		✓	✓	✓	✓	✓	✓		✓
	• Evaluate Best Practices			✓	✓		✓			
	• Make Recommendations	✓		✓	✓	✓	✓		✓	✓
	• Influence Community			✓	✓	✓	✓	✓	✓	✓

Based on Bloom's Taxonomy

NAME: _____

Greenhouse Gases: Ozone

Ozone can be found in two places in the atmosphere. In the stratosphere, radiation from the Sun turns oxygen into ozone. This forms the ozone layer, which protects living things from harmful radiation from the Sun. A tiny bit of the ozone from the ozone layer mixes into the lower atmosphere, in the troposphere. So, the troposphere contains a tiny amount of ozone naturally. However, human activities have caused more ozone to form in the troposphere. Ozone in the troposphere acts as a greenhouse gas, trapping radiation and leading to warming.

Name the two places in the atmosphere in which ozone can be found.

_____

_____

When gasoline is burned in cars and other automobiles, carbon and nitrogen compounds come out of the tailpipe and into the atmosphere. Sunlight breaks apart these carbon and nitrogen compounds to make ozone. The same thing happens to smoke from factories and power plants that burn fossil fuels. Ozone is one of the main compounds in smog.

The amount of ozone in the troposphere has increased by about 30% since humans have been building factories and automobiles. This increase is so much that scientists think ozone could play an important role in global warming. However, ozone has a short residence time in the atmosphere. Therefore, if people release less ozone into the lower atmosphere, than the amount of ozone in the lower atmosphere should decrease quickly.

NAME: _____

Greenhouse Gases: Ozone

1. Circle the word **TRUE** if the statement is TRUE **or** Circle the word **FALSE** if it is FALSE.

a) Ozone can be found in only one place in the atmosphere.
TRUE **FALSE**

b) A tiny amount of ozone from the stratosphere naturally sinks to the troposphere.
TRUE **FALSE**

c) Ozone is one of the main compounds in smog.
TRUE **FALSE**

d) Humans have increased the amount of ozone in the troposphere by driving cars and running power plants to make electricity.
TRUE **FALSE**

e) Ozone has a long residence time in the atmosphere.
TRUE **FALSE**

2. Put a check mark (✓) next to the answer that is most correct.

a) Which compounds from tailpipes break down in sunlight break to make ozone in the troposphere?

- ○ **A** carbon and water
- ○ **B** hydrogen and water
- ○ **C** carbon and nitrogen
- ○ **D** hydrogen and nitrogen

b) Which human activities have led to the increase of ozone in the troposphere?

- ○ **A** cutting forests
- ○ **B** fertilizing farms
- ○ **C** draining wetlands
- ○ **D** burning fossil fuels

c) Humans have increased the amount of ozone in the troposphere by about.

- ○ **A** 10%
- ○ **B** 30%
- ○ **C** 50%
- ○ **D** 70%

NAME: _____

Greenhouse Gases: Ozone

3. Answer each question with a complete sentence.

a) Explain how ozone gets into the troposphere by **NATURAL** processes.

_____

_____

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b) Explain how burning gasoline in cars and trucks leads to the increase of ozone in the troposphere.

_____

_____

_____

Research

4. Where are the smoggiest areas in the world?

Working as a class, divide a world map into regions. You may want to use continents as your regions. Break into smaller groups and assign each group to research a region. Using the library or internet resources, find out about areas in your region that have problems with smog. Mark these areas on the world map using push pins or sticky notes. Prepare a short statement about the problems that each area faces.

Take turns reading your statements until all of the areas on the map have been covered. Have a class discussion about ways in which people or technology can change in order to put less ozone into the atmosphere.